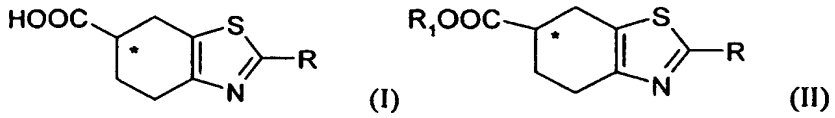
CLAIMS

1. A compound of formula (I) or of formula (II), either as a mixture of (R,S) enantiomers, or as a single (R) or (S) enantiomer, or a salt thereof,



wherein R is a protected amino group; and the asterisk * indicates the stereogenic carbon atom.

2. A compound as claimed in claim 1 or a salt thereof, as racemic (R,S) mixture, which is selected from:

- 2-acetylamino-4,5,6,7-tetrahydro-benzothiazole-6-carboxylic acid;
- 2-propionylamino-4,5,6,7-tetrahydro-benzothiazole-6-carboxylic acid;
- 2-acetylamino-4,5,6,7-tetrahydro-benzothiazole-6-carboxylic acid methyl ester;
- 2-acetylamino-4,5,6,7-tetrahydro-benzothiazole-6-carboxylic acid ethyl ester;
- 2-acetylamino-4,5,6,7-tetrahydro-benzothiazole-6-carboxylic acid propyl ester;
- 2-propionylamino-4,5,6,7-tetrahydro-benzothiazole-6-carboxylic acid methyl ester;
- 2-propionylamino-4,5,6,7-tetrahydro-benzothiazole-6-carboxylic acid ethyl ester; and
- 2-propionylamino-4,5,6,7-tetrahydro-benzothiazole-6-carboxylic acid propyl ester.

3. A compound of formula (I) or formula (II), or a salt thereof, according to claim 1, wherein the R group is a protected amino group in the form of an acylamino, carbamoyl, arylmethylamino, phthalimido or silylamino group.

4. A compound of formula (I) or formula (II), or a salt thereof, according to claims 1 or 3, as single (R) or (S) enantiomer.

5. A compound of formula (I) or formula (II), or a salt thereof, according to claims 1 or 3, as the single (S) enantiomer.

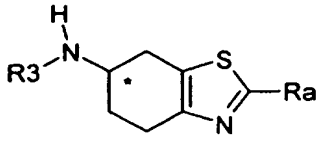
6. A compound of formula (I) or a salt thereof, according to claim 1, which is:

- (S)-2-acetylamino-4,5,6,7-tetrahydro-benzothiazole-6-carboxylic acid;
- (S)-2-propionylamino-4,5,6,7-tetrahydro-benzothiazole-6-carboxylic acid;
- (R)-2-acetylamino-4,5,6,7-tetrahydro-benzothiazole-6-carboxylic acid; or
- (R)-2-propionylamino-4,5,6,7-tetrahydro-benzothiazole-6-carboxylic acid.

7. A compound according to claims 4, 5 or 6, with enantiomeric purity of at least 96%.

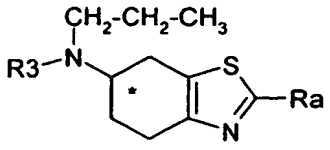
8. The use of a compound of formula (I), or a salt thereof, as defined in claim 1, for the preparation of pramipexole or of a pharmaceutically acceptable salt thereof.

9. The use according to claim 8, comprising the alkylation of a compound of formula (VII) as the single (S) enantiomer



(VII)

wherein Ra is a free or protected amino group, R_3 is hydrogen or a R_4-O-CO- group, wherein R_4 is straight or branched C_1-C_4 alkyl and the asterisk * has the same meaning as in claim 1, to obtain a compound of formula (VIII)

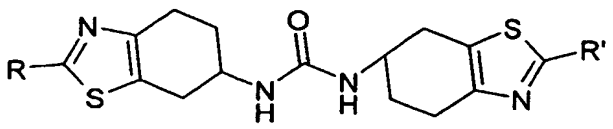


(VIII)

wherein Ra, R_3 and the asterisk * are as defined above, and, if necessary, the removal of the primary amino-protecting group and/or of the R_4-OR-CO- group from the secondary amino group and, if desired, its conversion to a pharmaceutically acceptable salt thereof, characterized in that:

a) a compound of formula (VII), wherein Ra is a protected amino group and R_3 is as defined above, as the single (S) enantiomer, is prepared by rearrangement of a compound of formula (I), as the single (S) enantiomer, *via* formation of isocyanate, and subsequent addition of a nucleophilic solvent or subsequent quenching in water in the presence of an acidic agent; or

b) a compound of formula (VII), wherein Ra is a free amino group and R_3 is hydrogen, as the single (S) enantiomer, is prepared by rearrangement of a compound of formula (I), as the single (S) enantiomer, *via* formation of isocyanate, and subsequent addition of water, to obtain a compound of formula (Ie)



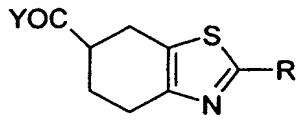
(Ie)

wherein R' has the same meaning as R defined above, and subsequent hydrolysis.

10. The use according to claim 9, variant a), wherein quenching in water in the presence of an acidic agent affords a compound of formula (VII), as defined in claim 9, wherein R_3 is hydrogen.

11. The use according to claim 9, variant a), wherein the nucleophilic solvent is a C_1-C_4 alkanol, to obtain a compound of formula (VII), as defined in claim 9, wherein R_3 is a R_4-O-CO- group, wherein R_4 is as defined in claim 9.

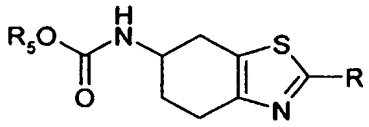
12. The use according to claim 9, variant a), wherein the rearrangement reaction is carried out according to Curtius in a nucleophilic solvent, via formation of a compound of formula of formula (Ia)



(Ia)

in which Y is N_3

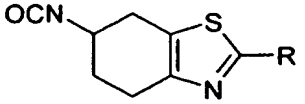
and of a compound of formula (Id)



(Id)

wherein R_5 is a straight or branched C_1-C_4 alkyl group, without recovery of the intermediates.

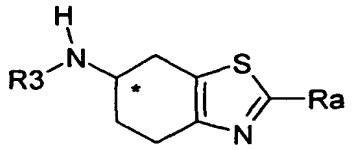
13. The use according to claim 9, wherein the rearrangement takes place via formation of a isocyanate of formula (Ic)



(Ic)

in which R is a protected amino group, and subsequent addition of a nucleophilic solvent or subsequent quenching in water in the presence of an acidic agent.

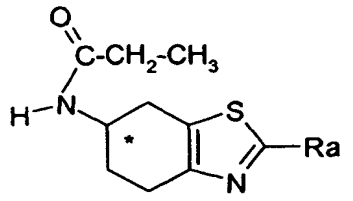
14. A process for the preparation of pramipexole, or a pharmaceutically acceptable salt thereof, comprising the acylation of a compound of formula (VII), either as the single (S) enantiomer or as mixture of (R,S) enantiomers



(VII)

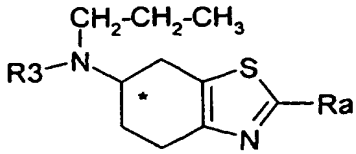
wherein R_3 is hydrogen and Ra is a free or protected amino group,

by reaction with propionic anhydride, and subsequent reduction of the resulting compound of formula (IX)



(IX)

wherein Ra is as defined above, by treatment with an alkali metal borohydride and molecular iodine, to obtain a compound of formula (VIII)



(VIII)

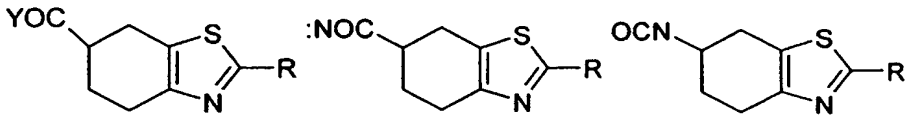
wherein R_3 is hydrogen and Ra is as defined above;

followed, if necessary, by deprotection of the primary amino group and/or by resolution of the mixture of (R,S) enantiomers into the single (S) enantiomer and, if desired, by conversion of pramipexole to a pharmaceutically acceptable salt thereof.

15. A process according to claim 14, wherein the alkali metal borohydride is $NaBH_4$ in amounts of 1-5 mols per mole of compound of formula (IX) and the amount of iodine is 0.5-3 mols per mole of compound of formula (IX).

16. The use according to claim 9, wherein the alkylation of a compound of formula (VII), wherein R_3 is hydrogen and Ra is a free or protected amino group, as the single (S) enantiomer, is carried out according to the process of claim 14 or 15.

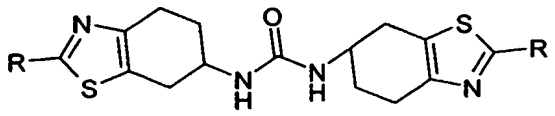
17. A compound of formula (Ia), (Ib), (Ic) or (Ie), either as mixture of (R,S) enantiomers or as a single (R) or (S) enantiomer



(Ia)

(Ib)

(Ic)



(Ie)

wherein Y is $NHOCOR_4$, N_3 or NH_2, in which R_4 is straight or branched C_1-C_4 alkyl and R is a protected amino group.